Data Sheet

Ultrastar® SSD1600MR

Enterprise Solid-State Drives

Highlights

- MLC NAND Flash for ultra-high performance and endurance
- Read-intensive <3DW/D for 5 years
- Best IOPS/Watt for reduced TCO
- 12Gb/s SAS interface for maximum throughput
- Advanced power loss data management technology
- Self-encrypting models conform to TCG's Enterprise specification

Applications/Environments

- Ultra-high performance tier-0 read endurance enterprise storage
- Enterprise-class servers and high performance computing
- Space and/or power constrained environments
- Online Transaction Processing (OLTP)
- Video pre- and post-production
- Cloud computing

1920GB, 1600GB, 1000GB, 800GB, 500GB, 400GB and 250GB
MLC | 2.5-inch SFF | SAS 12Gb/s

HGST Enterprise Storage Experience

HGST leverages decades of proven enterprise storage expertise in Serial Attached SCSI (SAS) design, reliability, firmware, customer qualification and system integration to the Ultrastar® SSD1600MR solid-state drive (SSD) family. The synergistic relationship between HGST's throughput-enhancing SSDs and traditional HDDs provides cost effective, end-to-end enterprise-class storage solutions, delivering reliability, compatibility, capacity, cost and system performance. This combination makes HGST a leading SSD/HDD provider with the experience and technology needed to meet escalating reliability, endurance and performance in the most demanding enterprise environments.

Maximum Performance, Reliability and Endurance

The Ultrastar SSD1600MR delivers high sequential throughput, up to 1100MB/s read and 700MB/s write (12Gb/s SAS). It also delivers up to 130,000 read and 30,000 write IOPS, reaching speeds >100 times faster than HDDs and double the speed of current 6Gb/s SSDs, allowing rapid access to "hot" enterprise data for improved productivity and operational efficiency. The Ultrastar SSD1600MR family offers significant value in terms of IOPS per Watt, while reducing total cost of ownership (TCO) through low power consumption, efficient cooling and reduced space requirements.

The Ultrastar SSD1600MR family combines enterprise-grade MLC NAND Flash memory, advanced endurance management firmware and power loss data management techniques to extend reliability, endurance and sustained performance over the life of the SSD. The Ultrastar SSD1600MR family achieves an extraordinary 0.35% annual failure rate (AFR) or 2.5 million hour mean-time-between-failure (MTBF). The 1920GB capacity model endures up to 10.5 Petabytes (PB) of random writes over the life of the drive—the equivalent of writing 5.8 Terabytes (TB) per day for five years.

For complete end-to-end data protection and reliability, the Ultrastar SSD1600MR family incorporates the T10 Data Integrity Field (DIF) standard, extended error correction code (ECC), Exclusive-OR (XOR) parity to protect against Flash die failure, parity-checked internal data paths without an external write cache, and an exclusive power loss data management feature that does not require supercapacitors. The Ultrastar SSD1600MR family is backed by a five year limited warranty, or the maximum Petabytes (PB) written (based on capacity).

Features and Benefits

	Feature / Function	Benefits
Performance	SAS 12Gb/s	12Gb/s / 6Gb/s Active-Active Dual Port
	MLC NAND Flash memory	Highest write performance with cost improved NAND for high endurance
	1100MB/s / 700MB/s sequential R/W	Maximum throughput and IOPS for ultra-fast access to data; >100x faster than typical HDD
	130K / 30K IOPS random R/W	
	50K IOPS on 70/30 mix R/W	
Power	9.0 and 11.0 Watt options	Improved performance with higher power option
Capacity	1920GB, 1600GB, 1000GB, 800GB, 500GB, 400GB, 250GB	More capacity for less space and power
Reliability	0.35% AFR (2.5M hours MTBF)	Reduced field replacement effort
	1E-17 bit error rate	Enhanced error detection and correction for optimal data integrity
	T10 end-to-end data protection	
	Exclusive-OR (XOR) NAND	Protection against Flash die failure
	Power loss data management	Assures data integrity during power failure
	Unlimited reads, up to 10.5PB random writes (1920GB)	Maximum endurance over the life of SSD
Integration	HDD architecture commonality	Compatibility with Ultrastar SAS HDDs
	Systems integration and test lab	Extensive interoperability and compliance testing

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HGST Quality and Service

HGST's Ultrastar SSD1600MR family extends the company's long-standing tradition of performance and reliability leadership. A balanced combination of new and proven technologies enables high reliability and availability to customer data.

HGST drives are backed by an array of technical support and services, which may include customer and integration assistance. HGST is dedicated to providing a complete portfolio of SSD/HDD solutions to satisfy today's monumental computing needs.

How to Read the Ultrastar Model Number

HUSMR1616ASS200 = 1600GB, SAS 12Gb/s

H	=	HGST
U	=	Ultrastar
S	=	Standard
MR	=	Multi level cell, read-intensive (2DW/D)
16	=	Full initial capacity (1600GB)
16	=	Capacity of this model (19 = 1920GB, 16 = 1600GB, 10 = 1000GB, 80 = 800GB, etc.)
A	=	Generation code
S	=	Small form factor (vs. L for Large FF)
S2	=	Interface, SAS 12Gb/s
0	=	Standard (3 = 3DW/D)
0	=	Crypto sanitize (1 = TCG encryption, 4 = No encryption, 5 = TCG + FIPS certified encryption)

Information and Technical Support

www.hgst.com (main website)
www.hgst.com/partners (partner website)

North America

support_usa@hgst.com
Toll Free: +1 888 426-5214, Direct: +1 408 717-8087

Asia Pacific

support_ap@hgst.com / +65 6840 9595

EMEA and UK

support_uk@hgst.com / +44 20 7133 0032

Germany

support_uk@hgst.com / +49 6929 993601

Program Support

Partners First Program: channelpartners@hgst.com

Specifications

Model # / Part #	HUSMR1619ASS234 / 0B32278 HUSMR1619ASS230 / 0B32213 HUSMR1619ASS231 / 0B32247 HUSMR1619ASS235 / 0B32297 HUSMR1616ASS204 / 0B32263 HUSMR1616ASS200 / 0B31079 HUSMR1616ASS201 / 0B32236 HUSMR1616ASS205 / 0B32285 HUSMR1610ASS204 / 0B32262 HUSMR1610ASS200 / 0B31078 HUSMR1610ASS201 / 0B32235 HUSMR1610ASS205 / 0B32284 HUSMR1680ASS204 / 0B32261 HUSMR1680ASS200 / 0B31077	HUSMR1680ASS201 / 0B32234 HUSMR1680ASS205 / 0B32283 HUSMR1650ASS204 / 0B32260 HUSMR1650ASS200 / 0B31076 HUSMR1650ASS201 / 0B32233 HUSMR1650ASS205 / 0B32282 HUSMR1640ASS204 / 0B32259 HUSMR1640ASS200 / 0B31075 HUSMR1640ASS201 / 0B32232 HUSMR1640ASS205 / 0B32281 HUSMR1625ASS204 / 0B32258 HUSMR1625ASS200 / 0B31074 HUSMR1625ASS201 / 0B32231 HUSMR1625ASS205 / 0B32280
Configuration		
Interface	SAS 12Gb/s	
Capacity (GB[1]) at 512 bytes/sector	1920 / 1600 / 1000 / 800 / 500 / 400 / 250	
Form factor	2.5-inch	
Flash memory technology	Multi Level Cell (MLC)	
Sector size support	512, 520, 528, 4K	
Performance		
Read throughput (max MB/s, sequential 64K)	1100	
Write throughput (max MB/s, sequential 64K)	700	
Read IOPS (max IOPS, random 4K)	130,000	
Write IOPS (max IOPS, random 4K)	30,000	
Reliability		
Error rate (non-recoverable bits read)	1 in 10^{17}	
MTBF[2] (M hours)	2.5	
Annual failure rate[2] (AFR)	0.35%	
Availability (hrs/day x days/wk)	24x7	
Endurance (max PB[1], random write)	10.5 / 5.8 / 4.8 / 2.92 / 2.4 / 1.46 / 1.2	
Power		
Requirement	+5 VDC (+/-5%) +12 VDC (+/-5%)	
Operating (W, typical)	9.0 and 11.0	
Idle (W)	2.2	
Physical		
z-height (mm)	15.0	
Dimensions (width x depth, mm)	70.1 x 100.6	
Weight (g, max)	187	
Environmental (operating)		
Case temperature	0° to 70°C	
Shock (half-sine wave)	1000G (0.5ms) 500G (2ms)	
Vibration, random (G RMS)	2.16, all axis (5 to 700 Hz)	

[1] One gigabyte (GB) is equal to one billion bytes, one terabyte (TB) is equal to 1,000GB (one trillion bytes), and one petabyte (PB) is equal to 1,000TB (one quadrillion bytes) when referring to solid-state drive or hard drive capacity. Accessible capacity will vary from the stated capacity due to formatting and partitioning of the drive, the computer's operating system, and other factors.

[2] MTBF and AFR targets are based on a sample population and are estimated by statistical measurements and acceleration algorithms under median operating conditions. MTBF and AFR ratings do not predict an individual drive's reliability and do not constitute a warranty.

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Product specifications provided are sample specifications and do not constitute a warranty. Information is true as of the date of publication and is subject to change. Actual specifications for unique part numbers may vary.

Please visit the Support section of our website www.hgst.com/support for additional information on product specifications. Photographs may show design models.

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